Comfortable and Durable Clothing Ensemble with Flame-Resistant Properties, Phase I

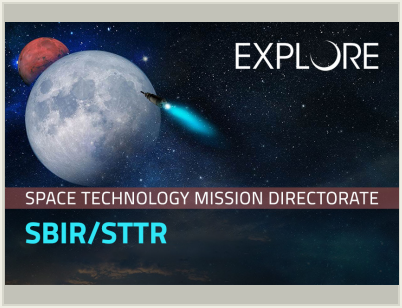
Completed Technology Project (2009 - 2009)

Project Introduction

NASA is now concerned with maintaining, validating, and improving fire safety on the ISS throughout its lifetime while providing maximum flexibility in the types of experiments and operations that can be conducted by the crew members. Thus, more comfortable, durable and flexible flame retardant crew clothing is required, especially during long term missions. Current cotton clothing is highly flammable and not suitable for fire fighting. There is urgent need to develop non-flammable alternatives for shirts, shorts, sweaters, and jackets without compromising the comfort and flexibility. This Phase I project aims to develop flame retardant textiles using a new class of chemicals called polyoxometalates (POMs). We have devised methods to anchor this class of compound to a variety of conventional (cotton based) fabrics. The overall goal is to take existing fabrics, with their desirable physical properties and high level of comfort, and add a flame retardant capability. The functionalized textile material will have thermal stability, reduction in smoke generation and flammability, reasonable cost, no skin and environmental toxicity, and permanence while retaining the desired properties of the starting material. Our novel flame resistant textile material will withstand harsh conditions without leaching of the agents.

Anticipated Benefits

Potential NASA Commercial Applications: At home : Clothes, Sleepwear, bed linen, blankets, mattresses, upholstered furniture covers, furniture fabrics, carpets, textile wall lining, curtains At work: Protective clothes for workers, military personnel and firemen, agricultural workers, technical fabrics such as belts and ropes, sunshades, sunblinds, tarpaulins Others: Tents (military or private), flags



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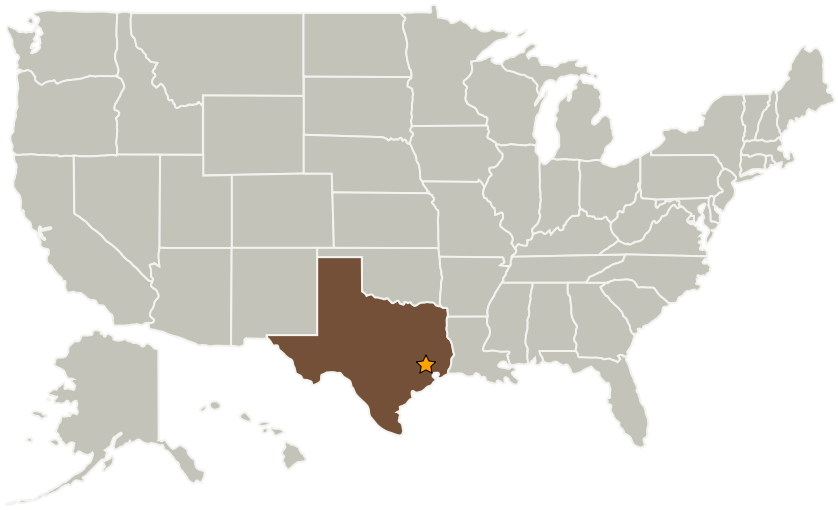
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Lynntech, Inc.	Supporting Organization	Industry	College Station, Texas

Primary U.S. Work Locations
Texas

Project Transitions

January 2009: Project Start

July 2009: Closed out

Closeout Summary: Comfortable and Durable Clothing Ensemble with Flame-Resistant Properties, Phase I Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

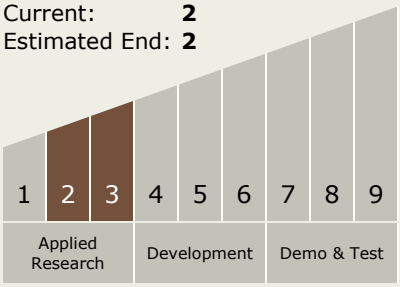
Carlos Torrez

Principal Investigator:

Waheguru P Singh

Technology Maturity (TRL)

Start: **3**
Current: **2**
Estimated End: **2**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.3 Protective Clothing and Breathing